IN THE SPECIFICATION:

Please amend the specification as follows:

Please replace paragraph 1 on page 2 of the specification as follows:

Specifically, the present invention provides a numerical calculation method, a numerical calculator or a recording medium that stores a numerical calculation program for a physical quantity U by solving $A \cdot U = f$, wherein A is a coefficient matrix (in N rows by N columns; wherein N is a positive integer) obtained through discrete of a partial differential equation to be satisfied by the physical quantity U, and f is an inhomogeneous term (source term). In the numerical calculation method, the numerical calculator or the recording medium, the processes of setting 0 as an initial value of a number m of repeating times, giving 0 as an initial value of a perturbation quantity ϕ and setting $(f - A.U^0)$ as an initial value r^0 of a residual r; and repeatedly executing a first step and a second step while incrementing the number m of repeating times until an approximate solution U^m is converged, and the first step includes the steps of setting an initial value U^0 of the physical quantity U; obtaining a predicted approximate value ψ^m of $A \cdot \phi = r^m$ through repeated calculation performed by a first calculation unit including an internal solver, and the second step includes the steps of: obtaining, from the predicted approximate value ψ^m, a corrected approximate value ϕ^m for minimizing L^2 norm of a residual ~~r^m~~ r^{m+1} through an optimization routine performed by a second calculation unit; and giving $(U^m + \phi^m)$ as an approximate solution U^{m+1} and giving $(r^m - A \cdot \phi^m)$ as a residual r^{m+1}, and in the second step, obtained elements of a vector sequence $A \cdot \phi^m$ are sampled by a given sampling method to be stored in a memory, and a residual minimization coefficient α_l^m (wherein $l = 1, \ldots, L$) used for obtaining the corrected approximate value ϕ^m is approximately obtained by using elements of a vector sequence $A \cdot \phi^k$ (wherein $k = m - L + 1, \ldots, m - 1$) stored in the memory.

Please replace paragraph 2 on page 5 of the specification as follows:

Assuming that the number of repeating times is m, a synthesize perturbation quantity φ^m for minimizing the L^2 norm of the residual r^{m+1} at (m+1)th-time and a new approximate solution U^{m+1} are defined as follows:

$$\phi^m = \alpha_1{}^m \psi^m + \sum_{l=2}^{L} \alpha_l{}^m \phi^{m-l+1} \quad \ldots \quad (5)$$

$$U^{m+1} = U^m + \phi^m \quad \ldots \quad (6)$$

wherein $\alpha_l{}^m$ (l = 1, 2, 3, ..., L) is a residual minimization coefficient and is a constant obtained through calculation described later. The residual is minimized so as to reduce the L^2 norm of the residual as r^{m+1} follows:

Please replace last paragraph on page 8 through paragraph 1 on page 9 as follows:

When this equation is expressed without using the symbol Σ,

$$r^{m+1} = r^m - (\alpha_1{}^m A\delta^m + \alpha_2{}^m A\delta^{m-1} + \alpha_3{}^m A\delta^{m-2} + \ldots + \alpha_L{}^m A\delta^{m-L+1})$$

The residual minimization coefficient $\alpha_l{}^m$ can be obtained by using, for example, the least square method employing a condition for minimizing the (m+1)th-~~order~~ time residual norm $\|r^{m+1}\|$ (a square root of a sum of squares).

~~$\|r^m\| = \sqrt{\sum_i^N (r^{m+1})^2}$~~ $\quad$ $\|r^{m+1}\| = \sqrt{\sum_i^N (r^{m+1})^2}$

~~$\|r^m\|^2 = \sum_i^N (r^{m+1})^2$~~ $\quad$ $\|r^{m+1}\|^2 = \sum_i^N (r^{m+1})^2$

$$= \sum_i^N (r^m - \sum_{l=1}^{L} \alpha_l{}^m A\delta^{m-l+1})^2$$

When this equation is differentiated with respect to $\alpha_l{}^m$, the following is obtained:

$$\partial / \partial \alpha_l{}^m (\|r^{m+1}\|^2) = 0$$